Voting System Security:

Where We've Been, Where We Are and Where We Plan to Go

Helping America Vote: A State Summit on Election Reform

October 12, 2003

Agenda

- What Is NIST?
- What Are Its Functions?
- What is the motivation for NIST's roles ?
  - Maintaining Trust and Confidence While Introducing New Technologies 
- NIST and HAVA: Next Steps
  - December Symposium

National Institute of Standards and Technology

NIST Assets Include:

NIST Laboratories -- National measurement standards

- 3,000 employees
- 1,500 technical staff
- 1,600 guest researchers
- Unique measurement and research facilities
- Joint institutes with universities

Extramural programs

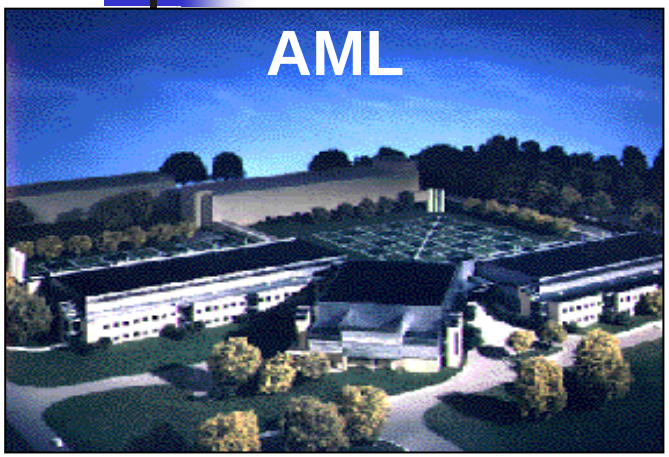
- Advanced Technology Program -- $640 million current R&D partnerships with industry
- Manufacturing Extension Partnership -- 400 centers nationwide to help small manufacturers
- Baldrige National Quality Award

NIST's mission is to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life.

NIST Laboratories Products and Services

- **Measurement Research**
  - 2,200 publications/year
- **Standard Reference Data**
  - 65 types available
  - 5,000 units sold/ year
- **Standard Reference Materials**
  - >1,300 products available
  - 30,000 units sold/year
- **Calibrations and Tests**
  - >3,000 items calibrated/year
- **Laboratory Accreditation**
  - 764 accreditations
- **Standards Committees**
  - 400 NIST staff, 900 committees

Unique NIST Research and Measurement Facilities



Advanced Measurement Laboratory—2004

- World-leading metrology facilities: air quality, temperature, vibration, humidity
- Homeland security, nanotech, semiconductors, biotech, advanced manufacturing...

Advanced Chemical Sciences Laboratory

- Cold rooms for biotechnology research
- Clean rooms and non-metallic modules
- Unique ventilation systems and capabilities to handle corrosive chemicals

NIST Center for Neutron Research

- Most versatile facility in the U.S. with more than 1750 annual users

NIST Works Closely with Customers and Stakeholders

- NIST Laboratory work emphasizes partnerships:
  - Consortia and standards development organizations
  - Voluntary consensus standards and guidelines
    - Driven by user community
    - Regulators may require adherence to NIST standards
  - Facilities users
  - Cooperative research agreements with other agencies, universities, and industry
  - Laboratory accreditation
  - Expert advice to government agencies and others
  - Contracts, grants, collaborative research

Usability Engineering

Goals: To improve the methods employed for evaluating the usability of IT products by:

- Working with industry to develop test methodologies, standards, and benchmarks for usability evaluation.
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- Developing a testbed for innovative methods of usability evaluation.

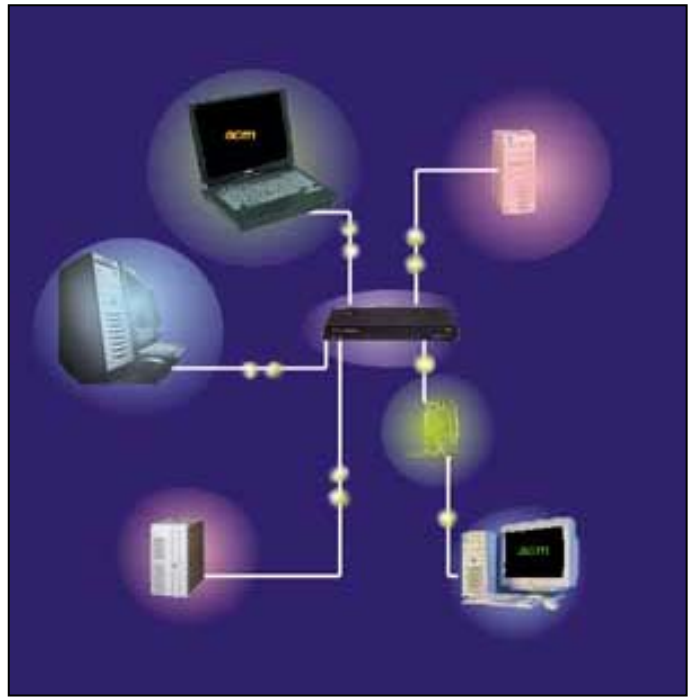
NIST activities:

- CIFter (Common Industry Format: Testing, Evaluation, and Reporting): developing benchmark test data for web usability evaluation methods.
- IUSR (Industry Usability Reporting): Encouraging software supplier and purchaser organizations to work together to understand user needs.
- Web Metrics: developing a methodology for rapid, remote, automated usability testing of web sites.

IT Security

NIST's mandates:

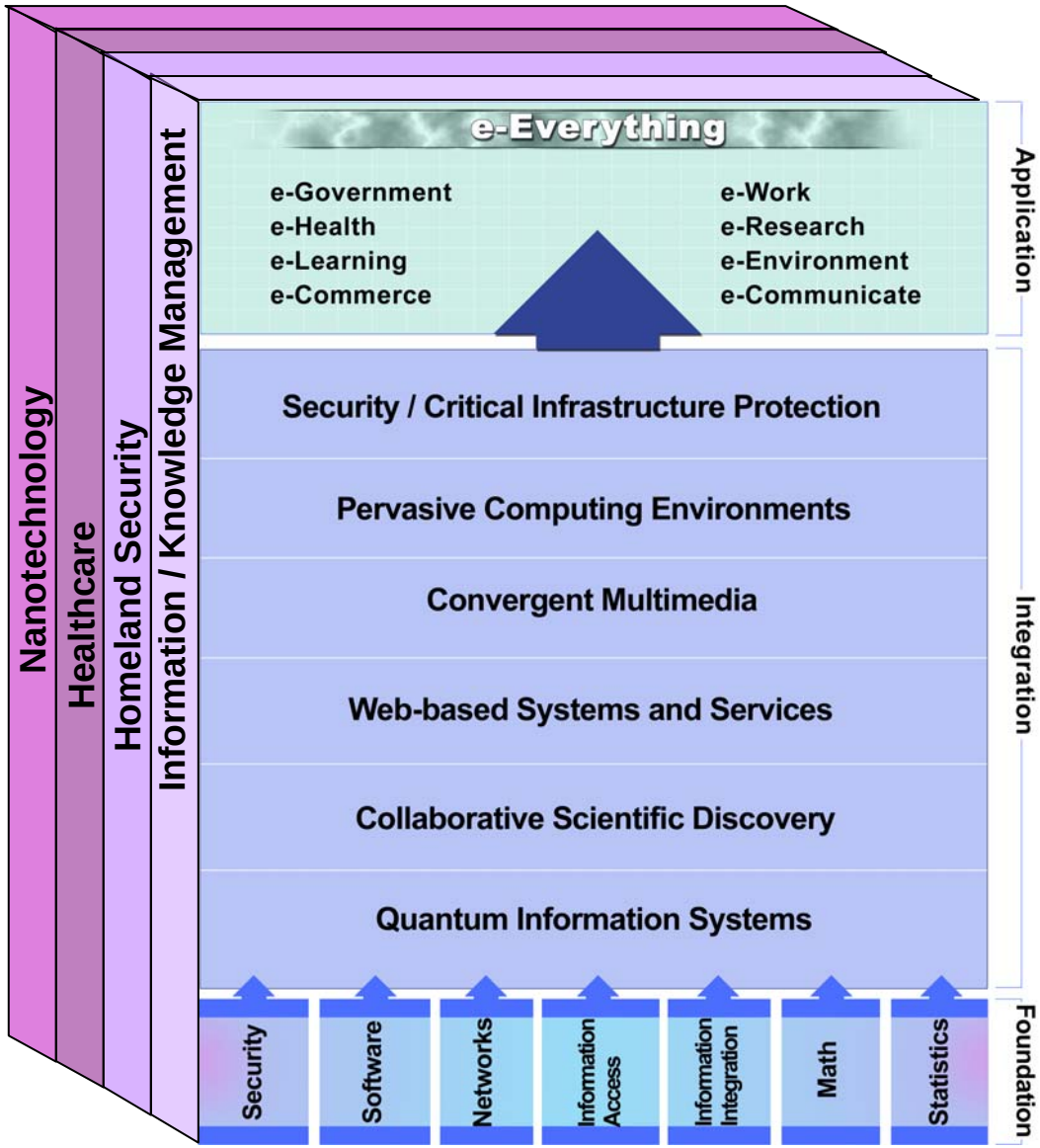
- Computer Security Act
- Cyber Security Research and Development Act
- Federal Information Security Management Act (FISMA)



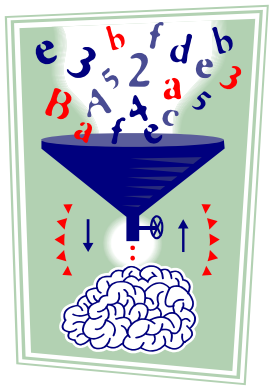
NIST activities:

- Cryptographic standards and applications (Advanced Encryption Standard)
- Security testing and validation (National Information Assurance Partnership)
- Guidelines, procedures, and best practices for federal and private sector IT security
  - Federal Information processing standards
  - Computer Security Expert Assist Team (CSEAT)

NIST Information Technology Laboratory



Motivation



Customers Ask:

Is the IT system doing what I expect?

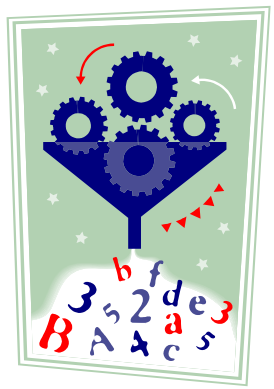
Has the data been tampered with?

Am I acquiring the relevant data?

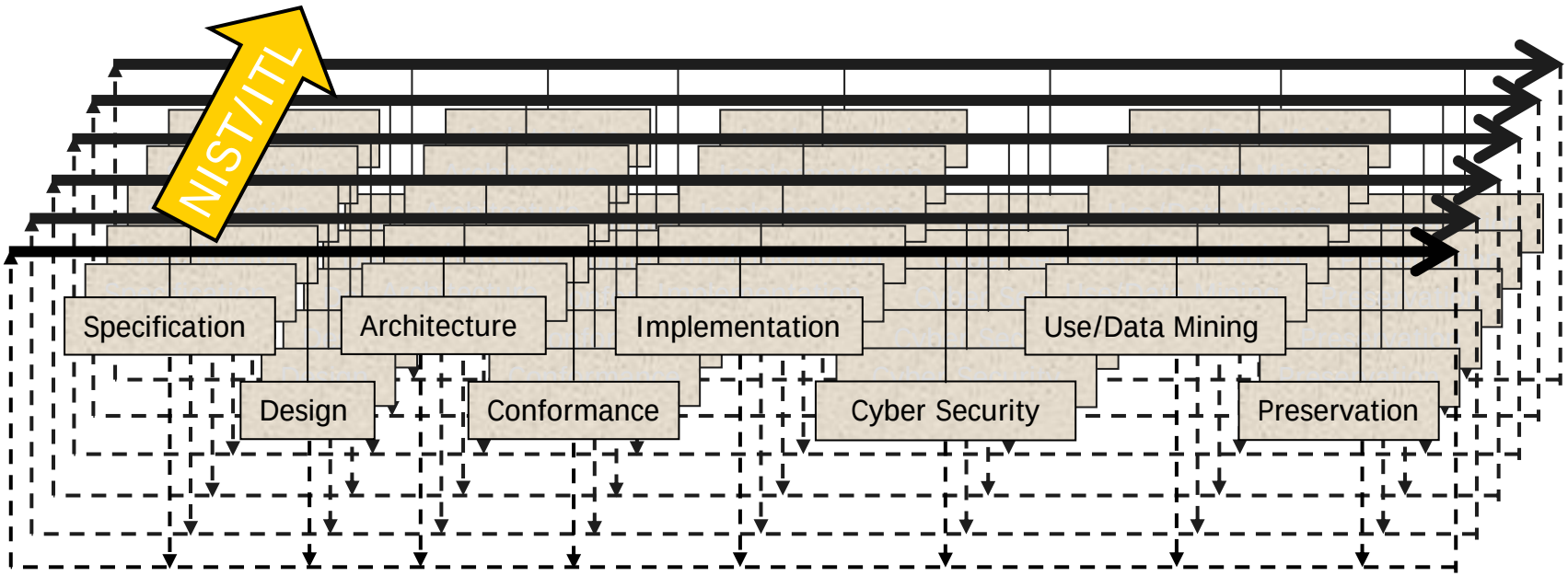
Will data be available when I need it?

Are my measurements provably correct?

Can I use information to speed development?



Maintain Trust and Confidence



Interweaving Security Fabric

Physical Security

Laws & Ethics

Auditing

Management

Operational Security

Information Security

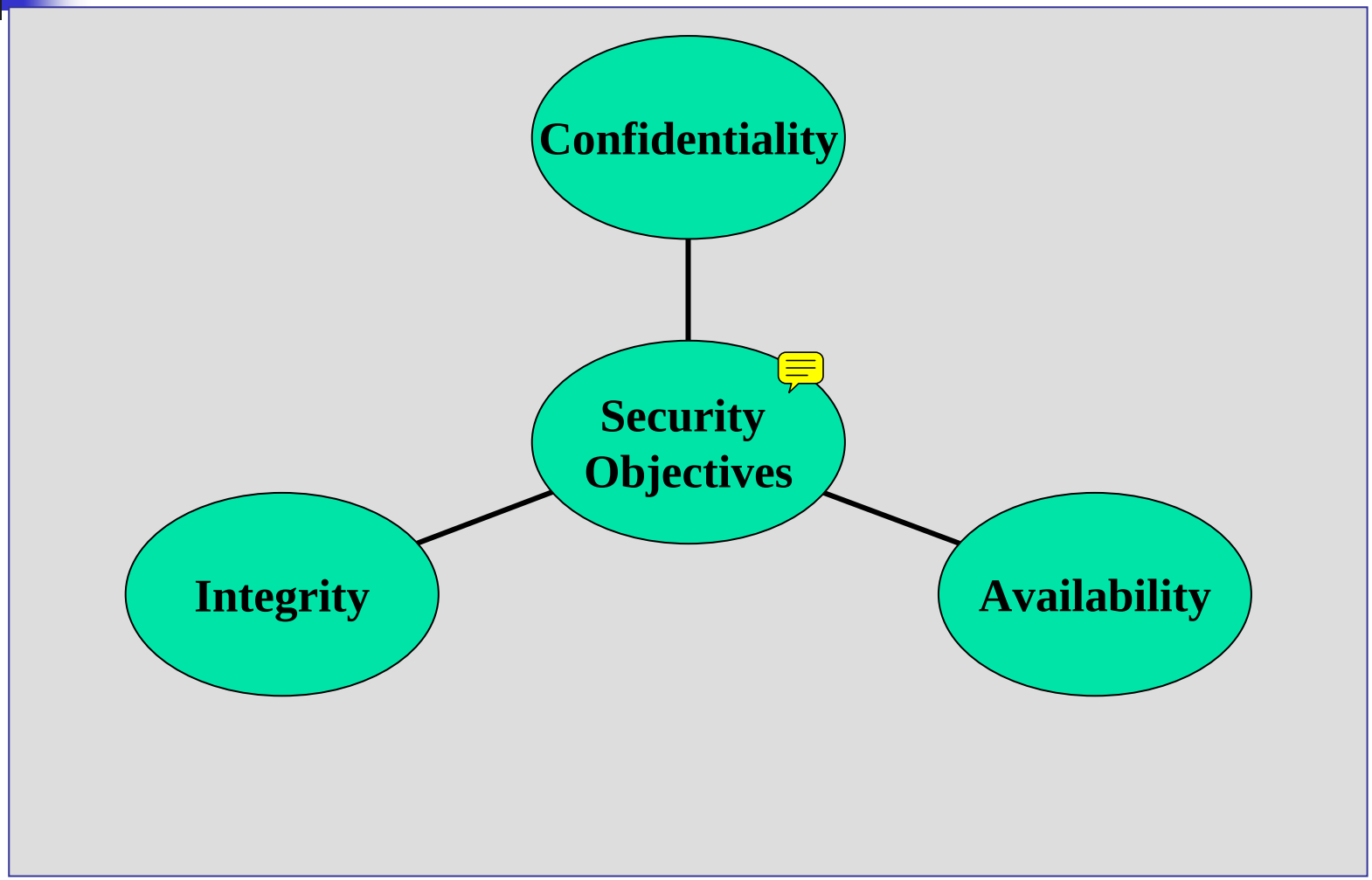
Access Control

Cryptography

Disaster Recovery

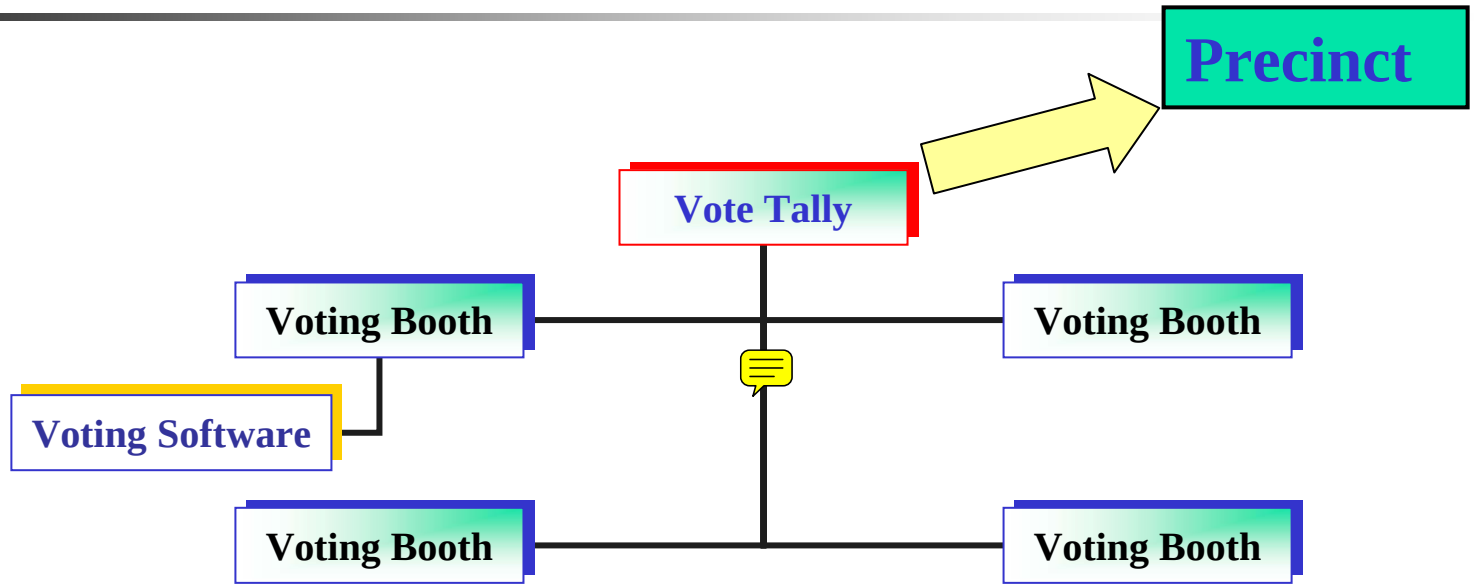
Adapted from: CISSP All in One Certification

Critical Security Services



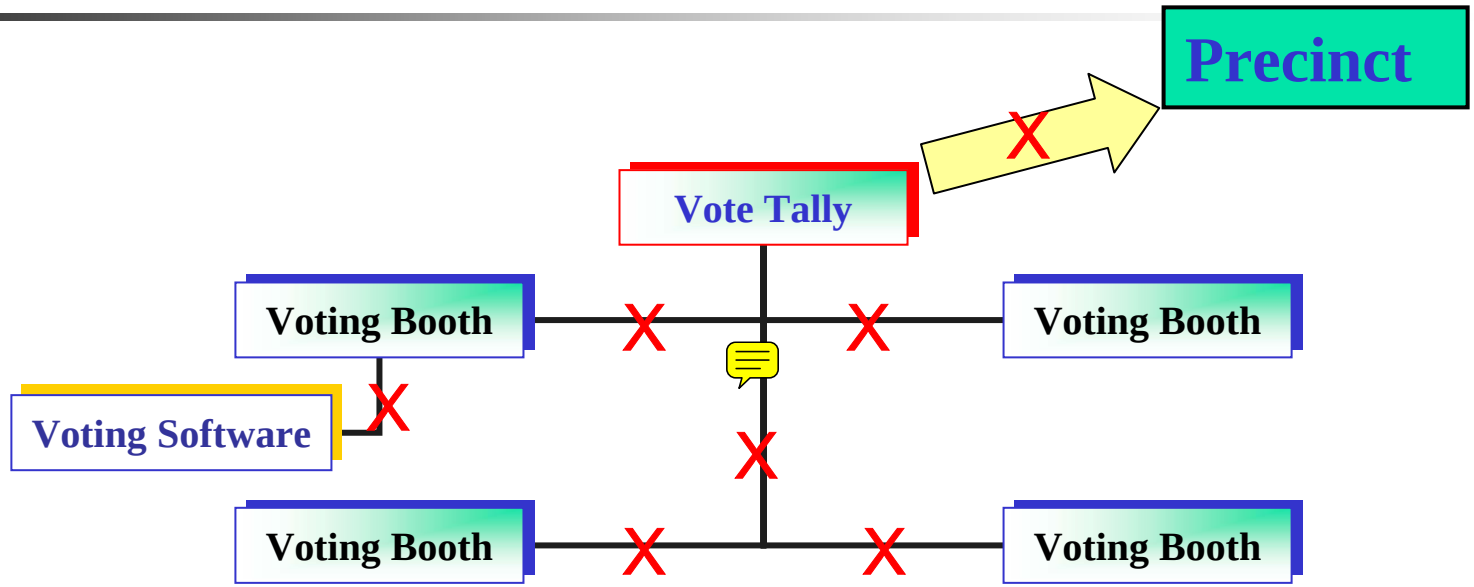
Adapted from: CISSP All-in-One Certification

Polling Place Vulnerabilities



- Who has access to what information ?
- Software Security
- Conformance Testing- ISO 17025 Standards

Polling Place Vulnerabilities



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Initial Voting System Efforts at NIST

- Research 1970's, 80's. Two papers published:
  - Effective Use of Computing Technology in Vote Tallying, NBS SP 500-30, 1978, Saltman
  - Accuracy, Integrity, and Security in Computerized Vote-Tallying, NBS SP 500-158, 1988, Saltman

Recent Voting System Activities at NIST

- NIST Reviewed Voting Process/Technology after the 2000 election
- Help America Vote Act of 2002
  - Established Election Assistance Commission (EAC) and Technical Guidelines Development Committee (TGDC)
  - NIST has specific roles 
- Specific NIST/HAVA Roles
  - NIST Director chairs TGDC
  - Advise EAC and TGDC as requested
  - Support Grants Program
  - Conduct Usability/Accessibility Research
  - Reporting functions
  - Accreditation role

NIST Planning for HAVA Implementation

Current Activities:

- Established NIST Voting Standards Project Leader: Allan Eustis
- Network with members of the election community, build rapport, learn concerns and issues
- Planning for Testing Laboratory Accreditation program
- Hardware/Software interactions and testing study
- Human Factors Report: Undergoing Review

NIST Expertise :Build on current VSS

Offer leadership, measurements, standards, data, and expert guidance needed to support the Election Assistance Commission:

- Effectively and efficiently manage the Technical Guidelines Development Committee
- Foster Development of Voluntary, Consensus Guidelines
- Research and recommend technologies and guidelines
- Technical guidance on implementing election related technologies
- Improve Testing Programs
- Enable pilots and development of new election technologies

Major NIST customers for election system support include:

- State and local election officials
- Industry/Vendors
- Independent Testing Authorities
- Standards Developing Organizations

Collaborative Contributions to Voting Systems

National Benefit

- Improved Voter Experience
- Improved Election Process

Election Technologies

- IT Systems: development, testing
- Security
- Usability/ Accessibility
- Information Assurance

NIST expertise in measurements, standards, and data lead to:

- Partnerships
- Technical excellence
- Objectivity
- Accuracy
- Reliability
- Performance

Next Steps

- Host First NIST Symposium on Building Trust and Confidence in Voting Systems to:
  - Foster dialogue and collaboration amongst voting and elections stakeholders
  - Explore HAVA implementation issues
    - December 10th & 11th , 2003 Gaithersburg, Maryland
    - http://vote.nist.gov
- Allan.eustis@nist.gov